In the Claims

1. (currently amended) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming [[a]] an insulative barrier layer to threshold voltage (V_t) shift inducing material over the substrate;

forming an opening at least into the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

2. (original) The method of claim 1 wherein the barrier layer is formed over the insulation layer.

3. (original) The method of claim 1 wherein the barrier layer comprises a silicon nitride.

4. (original) The method of claim 1 wherein the barrier layer consists essentially of a globally planar barrier layer.

5. (original) The method of claim 1 wherein the forming an opening further comprises forming a congruent opening through the barrier layer.

6. (original) The method of claim 1 wherein the opening is formed completely through the insulation layer.

7. (original) The method of claim 1 wherein the dielectric layer comprises a tantalum oxide.

8. (original) The method of claim 1 wherein the providing V_t shift material comprises providing at least one impurity comprising layer over the barrier layer.

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9. (original) The method of claim 1 wherein the providing V_t shift inducing material comprises annealing the dielectric layer.

10. (original) The method of claim 9 wherein the annealing comprises oxide annealing.

11. (original) The method of claim 9 wherein the annealing comprises heating the dielectric to at least about 600 °C in the presence of a nitrogen-containing oxide provided at a partial pressure of at least about 200 milliTorr.

12. (original) The method of claim 1 wherein the V_t shift inducing material comprises N_2O.

13. (original) The method of claim 1 wherein the electronic device comprises a transistor.

14. (original) The method of claim 1 wherein the substrate comprises a bulk semiconductor wafer.

15. (original) The method of claim 1 further comprising forming a capacitor electrode at least within the opening before forming the dielectric layer.

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16. (currently amended) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming [[a]] an insulative barrier layer to V_t shift inducing material over the insulation layer;

forming an opening through the barrier layer and into the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

17. (original) The method of claim 16 wherein the barrier layer comprises Si_3N_4.

18. (original) The method of claim 16 wherein the barrier layer consists essentially of a globally planar barrier layer.

19. (original) The method of claim 16 wherein the dielectric layer comprises Ta_2O_5.

20. (original) The method of claim 16 wherein the providing V_t shift inducing material comprises oxide annealing the dielectric layer and the V_t shift inducing material comprises N_2O.

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21. (original) The method of claim 16 further comprising forming a capacitor electrode at least within the opening before forming the dielectric layer.

22. (previously amended) A capacitor forming method comprising:

forming a barrier layer to V_t shift inducing material over a substrate, the substrate including an electronic device;

forming an insulation layer over the barrier layer;

forming an opening into at least the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

23. (original) The method of claim 22 wherein the barrier layer comprises Si_3N_4.

24. (original) The method of claim 22 wherein the barrier layer consists essentially of a globally planar barrier layer.

25. (original) The method of claim 22 wherein the opening is formed completely through the insulation layer and the barrier layer.

26. (original) The method of claim 22 wherein the dielectric layer comprises Ta_2O_5.

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27. (original) The method of claim 22 wherein the providing V_t shift inducing material comprises oxide annealing the dielectric layer and the V_t shift inducing material comprises N_2O.

28. (original) The method of claim 22 further comprising forming a capacitor electrode at least within the opening before forming the dielectric layer.

29. (original) A capacitor forming method comprising:

forming a first insulation layer over a substrate, the substrate including an electronic device;

forming a barrier layer to V_t shift inducing material over the first insulation layer;

forming a second insulation layer over the barrier layer;

forming an opening into at least the second insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

30. (original) The method of claim 29 wherein the barrier layer comprises Si_3N_4.

31. (original) The method of claim 29 wherein the barrier layer consists essentially of a globally planar barrier layer.

E1 32. (original) The method of claim 29 wherein the opening is formed through the second insulation layer and barrier layer and into the first insulation layer.

33. (original) The method of claim 29 wherein the dielectric layer comprises Ta_2O_5.

34. (original) The method of claim 29 wherein the providing V_t shift inducing material comprises oxide annealing the dielectric layer and the V_t shift inducing material comprises N_2O.

35. (original) The method of claim 29 further comprising forming a capacitor electrode at least within the opening before forming the dielectric layer.

36. (currently amended) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming an opening into the insulation layer, the opening having a sidewall;

forming a capacitor electrode at least within the opening and over the sidewall;

after forming the capacitor electrode, forming a barrier layer to V_t shift inducing material at least over all of the insulation layer;

after forming the barrier layer, forming a high K capacitor dielectric layer at least over the capacitor electrode; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

37. (original) The method of claim 36 wherein the forming the barrier layer comprises chemical vapor depositing at a step coverage of less than about 25%.

38. (original) The method of claim 37 wherein the barrier layer has a thickness over the sidewall of from about 0 to about 300 Angstroms.

39. (original) The method of claim 36 wherein the barrier layer comprises Si_3N_4.

40. (original) The method of claim 36 wherein the barrier layer consists essentially of a globally planar barrier layer.

41. (original) The method of claim 36 wherein the dielectric layer comprises Ta_2O_5.

42. (original) The method of claim 36 wherein the providing V_t shift inducing material comprises oxide annealing the dielectric layer and the V_t shift inducing material comprises N_2O.

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43. (currently amended) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming an opening into the insulation layer, the opening having a sidewall;

forming a capacitor electrode at least within the opening and over the sidewall;

forming a high K capacitor dielectric layer at least over the capacitor electrode;

after forming the high K capacitor dielectric layer, forming a barrier layer to V_t shift inducing material at least over all of the insulation layer; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

44. (original) The method of claim 43 wherein the dielectric layer comprises Ta_2O_5.

45. (original) The method of claim 43 wherein the forming the barrier layer comprises chemical vapor depositing at a step coverage of less than about 25%.

46. (original) he method of claim 45 wherein the barrier layer has a thickness over the sidewall of from about 0 to about 300 Angstroms.

47. (original) The method of claim 43 wherein the barrier layer comprises Si_3N_4.

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48. (original) The method of claim 43 wherein the barrier layer consists essentially of a globally planar barrier layer.

49. (original) The method of claim 43 wherein the providing V_t shift inducing material comprises oxide annealing the dielectric layer and the V_t shift inducing material comprises N_2O.

50. (original) The method of claim 43 wherein the providing V_t shift inducing material comprises annealing the dielectric layer and the forming the barrier layer occurs before the annealing.

Claims 51-57 (cancelled).

58. (previously added) The method of claim 1 wherein the barrier layer is formed on the insulation layer.

59. (previously added) The method of claim 1 further comprising providing Vt shift inducing material over the insulation layer.

60. (previously added) The method of claim 16 wherein the barrier layer is formed on the insulation layer.

61. (previously added) The method of claim 22 wherein the barrier layer is formed on the substrate.

62. (previously added) The method of claim 22 further comprising providing Vt shift inducing material over the insulation layer.

63. (previously added) The method of claim 29 wherein the barrier layer is formed on the first insulation layer.

64. (previously added) The method of claim 36 wherein the barrier layer is formed on the insulation layer.

65. (previously added) The method of claim 43 wherein the barrier layer is formed on the insulation layer.

66. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming a globally planar barrier layer to threshold voltage (V_t) shift inducing material over the substrate;

forming an opening at least into the insulation layer;

E1

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

67. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device having an elevational height;

forming a barrier layer to threshold voltage (V_t) shift inducing material over the substrate, all of the barrier layer being above the elevational height of the electronic device;

forming an opening at least into the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

68. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming a globally planar barrier layer to V_t shift inducing material over the insulation layer;

E1

forming an opening through the barrier layer and into the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

69. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device having an elevational height;

forming a barrier layer to V_t shift inducing material over the insulation layer, all of the barrier layer being above the elevational height of the electronic device;

forming an opening through the barrier layer and into the insulation layer;

forming a high K capacitor dielectric layer at least within the opening; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

70. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming an opening into the insulation layer, the opening having a sidewall;

forming a capacitor electrode at least within the opening and over the sidewall;

after forming the capacitor electrode, forming a globally planar barrier layer to V_t shift inducing material at least over the insulation layer;

after forming the barrier layer, forming a high K capacitor dielectric layer at least over the capacitor electrode; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.

71. (new) A capacitor forming method comprising:

forming an insulation layer over a substrate, the substrate including an electronic device;

forming an opening into the insulation layer, the opening having a sidewall;

forming a capacitor electrode at least within the opening and over the sidewall;

forming a high K capacitor dielectric layer at least over the capacitor electrode;

after forming the high K capacitor dielectric layer, forming a globally planar barrier layer to V_t shift inducing material at least over the insulation layer; and

providing V_t shift inducing material over the barrier layer, the barrier layer retarding movement of the V_t shift inducing material into the electronic device.